REMARKS

This is a full and timely response to the non-final Office action mailed February 12, 2008. Reexamination and reconsideration in view of the foregoing amendments and following remarks is respectfully solicited.

Claims 11-14, 16, and 18-20 are now pending in this application, with Claims 11 and 20 being the independent claims. Claims 14 and 20 have been amended herein, and Claims 1-10, 15, 17, and 21-25 have been canceled. No new matter has been added.

Rejections Under 35 U.S.C. § 103

Claims 1, 20, and 25 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over U.S. Patent Nos. 3,177,711 (Ham et al.) and 4,324,144 (Miyata et al.); Claim 2 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and U.S. Patent No. 4,644,270 (Oates et al.), Claim 4 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and U.S. Patent Nos. 6,658, 216 (Iida et al.); Claim 5 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and U.S. Patent No. 5,497,147 (Arms et al.); Claim 7 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and U.S. Patent No. 5,854,553 (Barclay); Claim 9 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and British Patent No. 2,167,603 (Wilkinson); Claim 10 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and U.S. Patent No. 6,486,657 (Schroeder); Claims 11 and 12 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., and U.S. Patent No. U.S. Patent No. 4,842,477 (Stowell); Claim 13 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., Stowell, and U.S. Patent No. 4,230,436 (Davison); Claim 14 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., Stowell, and Oates et al.; Claim 16 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., Stowell, and Barclay; Claim 18 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et al., Stowell, and Wilkinson; and Claim 19 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Ham et al., Miyata et

al., Stowell, and Schroeder. These rejections are respectfully traversed.

Independent Claim 11 relates to a turbine blade proximity control system, and recites, *inter alia*:

> a frequency modulation (FM) demodulator adapted to receive the frequency modulated sensor signal and operable, in response thereto, to supply a proximity signal having an amplitude that varies with, and is representative of, the proximity of each of the turbine blades to the non-rotating turbine component; and
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> a controller coupled to receive the proximity signal from the FM detector and operable, in response thereto, to control the proximity of the turbine blades to the non-rotating turbine component.

Independent Claim 20 relates to a gas turbine engine and recites, *inter alia*:

> a frequency modulation (FM) demodulator coupled to receive the frequency modulated sensor signal and operable, in response thereto, to supply a proximity signal having an amplitude that varies with, and is representative of, the proximity of each of the turbine blades to either the turbine case or one or more components mounted thereto, and
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> a controller coupled to receive the proximity signal from the FM detector and operable, in response thereto, to control the proximity of each of the turbine blades to either the turbine case or one or more components mounted thereto.

Ham et al. relates to an apparatus and method for determining flow through a turbine flowmeter, and discloses a pickup winding (20) electrically coupled in parallel with a capacitor (44) to provide tuning with resonance either when a flowmeter vane (8) is adjacent to or remote from the pickup winding (20). Ham et al. further discloses that the winding (20) and capacitor (44) provide a highly variable reactance in the feedback connection to the tap of a coil (26), which forms an LC oscillator tank circuit with another capacitor (30). As a result, "the magnitude of the [oscillator's] oscillations is modulated at a frequency directly proportional to the frequency of passage of the vanes 8 past the pickup unit." See col. 3, ll. 54-56. Hence, Ham et al. discloses nothing whatsoever regarding proximity detection, let alone turbine blade proximity detection and control of turbine blade proximity.

Miyata et al. similarly relates to an apparatus and method for determining flow through a turbine flowmeter, and discloses an impeller (9) that revolves in the presence of fluid flow so that blades (12) on the impeller pass in front of a detection electrode (21),

and vary the electrostatic capacity therebetween. The change of electrostatic capacity is given to an oscillation circuit (30), which supplies a signal that has been frequency-modulated. The frequency-modulated oscillation signal is supplied to a frequency discriminator (33), where the signal is demodulated and converted into a corresponding change of amplitude. The signal from the discriminator (33) is sent to a shaping circuit (34), which supplies pulse voltage signals proportional to the number of the blades (12) that have passed the detection electrode (21). The pulse voltage signals are counted by a counter to determine, from the number of revolutions of the impeller, the flow rate of the fluid. Hence, as with Ham et al., Miyata et al. also fails to disclose proximity detection, let alone turbine blade proximity detection and control of turbine blade proximity.

Oates et al. relates to a proximity sensor system and method for turbine blades, and discloses an oscillator circuit (80) for supplying a signal to a proximity sensor (S1). More specifically, Oates et al. discloses that the oscillator (80) supplies a fixed-frequency (e.g., 1 MHz) signal to the sensor (S1) via a buffer amplifier (82), a trifilar wound transformer (T1), and a three-conductor shielded cable (88) (col. 4, ll. 49-58; FIG. 5). As is clear from the description and corresponding illustrations, the oscillator (80) generates and supplies a **fixed-frequency** signal, and does not generate and supply a variable frequency signal having a frequency that varies based on the proximity of the sensor coil to the turbine blades. Moreover, there is no disclosure regarding control of turbine blade proximity, as is now recited in each of independent Claims 11 and 20.

As to Stowell, this reference relates to microwave-based turbine blade proximity detection and control. More specifically, Stowell discloses a sensor (25) through which two sinusoidal microwave signals pass along two lines (18, 21). Any change in clearance between a blade and a shroud is evinced by a relative phase shift between the signals. Stowell also discloses modifying the clearance based on the phase shift.

Applicant submits that suitable factual findings have not been articulated as to why the ordinarily skilled artisan would combine Ham et al., Miyata et al., Oates et al., and Stowell to obtain the configuration claimed in independent Claims 11 and 20. This lack of clear articulation of factual findings runs contrary to the examination guidelines recently published by the Office. Moreover, the rationale proffered in the Office action

does not comport with any of the rationales delineated in the guidelines.

Specifically, Applicant notes that the proffered rationale does not comport with the rationale of "Combining Prior Art Elements According to Known Methods to Yield Predictable Results" in that the Office action does not articulate a factual finding that, in combination, each element recited in these claims would have performed the same function as it did separately. It is believed that such a finding cannot be made. In particular, rather significant and non-obvious modifications would need to be made to the devices disclosed in each of these references in order that the fluid flow sensors of Ham et al. and/or Miyata et al. could be used to detect turbine blade proximity. Moreover, the proximity sensing device of Oates et al. and/or and the proximity sensing and control device of Stowell would also have to be significantly modified to be compatible with the detectors of Ham et al. and Miyata et al.

The proffered analysis also does not comport with the rationale of "Simple Substitution of One Known Element for Another to Obtain Predictable Results." Indeed, a mere substitution would not result in Applicants' claimed invention. Rather, significant modifications would have to be made to each of the cited references. The rationale of "Use of Known Technique To Improve Similar Devices in the Same Way" would also fail to suggest Applicants' invention. This is because none of these references allow a finding of fact that suggests a comparable device improved in the same way as the claimed invention.

It is further noted that the Office action includes no articulated findings of fact that would support the rationale of "Applying a Known Technique to a Known Device Ready for Improvement to Yield Predictable Results." Indeed, there was no articulation of a finding that one of ordinary skill would have recognized that applying the fluid flow rate sensors of Ham et al. and Miyata et al. to the systems of either Oates et al. or Stowell would have yielded the improved system as claimed in independent Claims 11 and 20. The so-called "Obvious to Try" rationale is also not supported because there is no articulation of a finding that the ordinarily skilled artisan could have pursued known potential solutions with a reasonable expectation of success in coming to the claimed system. The rationale of "Known Work in One Field of Endeavor May Prompt Variations of it for Use in Either the Same Filed or a Different One Based on Design

Incentives or Other Market Forces if the Variations Would Have Been Predictable to One of Ordinary Skill in the Art" also fails because a factual finding of any design incentives or market forces that would have suggested Applicants' claimed invention has not been articulated.

Finally, there is no "Teaching, Suggestion, or Motivation . . ." rationale, either. Indeed, it is unclear why a person of ordinary skill in the art of turbine blade proximity detection and control would even look to fluid flow sensors for solutions to a problem.

As to the other cited references, namely Iida et al., Arms et al., Schroeder, Wilkinson, and Davison, none of these disclose or suggest at least independent Claims 11 and 20.

In view of the foregoing, Applicant requests reconsideration and withdrawal of the § 103 rejections.

Conclusion

Based on the above, independent Claims 11 and 20 are patentable over the citations of record. The dependent claims are also submitted to be patentable for the reasons given above with respect to the independent claims and because each recite features which are patentable in its own right. Individual consideration of the dependent claims is respectfully solicited.

The other art of record is also not understood to disclose or suggest the inventive concept of the present invention as defined by the claims.

Hence, Applicant submits that the present application is in condition for allowance. Favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office action, and an early Notice of Allowance are requested.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

If for some reason Applicant has not paid a sufficient fee for this response, please consider this as authorization to charge Ingrassia, Fisher & Lorenz, Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

INGRASSIA FISHER & LORENZ

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